REMARKS/ARGUMENTS

Favorable reconsideration of this application, in light of the present amendments and following discussion, is respectfully requested.

Claims 9-10 have been cancelled. Claims 6 and 8 have been amended to further recite a step of controlling the flow of the furnace gas to allow the furnace gas to flow in the direction of the movement of the hearth by varying a size of the aperture of the one or more perforations. Basis for this is found in the paragraph bridging pp. 21-22. Claim 7 has been amended to recite a step of controlling the flow of the furnace gas to allow the furnace gas to flow in the direction of the movement of the hearth by moving at least one of the partitions vertically. Basis for this is found at page 23, lines 3-7.

New Claim 16 is based on Claim 1, and further recites that flow rate-controlling partitions are arranged for permitting a controlled flow of furnace gas therepast, that the pressure of the furnace gas in the cooling step is maintained higher than that of the gas in the feeding step and that, due to the higher pressure of the furnace gas in the cooling step, the furnace gas in the cooling step is allowed by the flow rate-controlling partitions to flow in the direction of the movement of the hearth, but oxidizing gas is prevented by the flow rate-controlling partitions from flowing from the discharging step to the cooling step. Basis for this is believed to be evident from page 25, lines 22-23, the paragraph bridging pp. 21-22 and the discussion in the prior response.

Claims 1-10 and 15 were newly rejected under 35 U.S.C. § 103 as being obvious over Kamikawa et al. The Office Action there recognized that Kamikawa et al "does not specify allowing the flow [of] the furnace gas in the direction of the movement of the hearth," "maintaining higher pressure in [the] melting step," or "maintaining higher pressure in the cooling step than the feeding step," but deemed that these features would have been obvious therein based on the description at lines 24-35 of column 8 that the partition plates regulate

the pressure inside the furnace "in order to increase the operation efficiency." This rejection is respectfully traversed because Kamikawa et al *teaches away from* the proposed modifications of the Office Action.

Claim 1 recites that the furnace gas in the cooling step *is allowed* to flow in the direction of the movement of the hearth using the flow rate-controlling partitions. New Claim 16 similarly recites that, due to the higher pressure of the furnace gas in the cooling step, the furnace gas in the cooling step *is allowed* by the flow rate-controlling partitions to flow in the direction of the movement of the hearth. As was explained in the prior response, the invention is based on the idea of allowing the flow of furnace gas in the direction of movement of the hearth. Since the furnace gas in the cooling step is allowed by the flow rate-controlling partitions to flow in the direction of the movement of the hearth, the pressure therein is increased, and the tendency of oxidizing air from the feeding portion to enter therein is reduced.

The partitions of Kamikawa et al are instead explicitly and repeatedly described as being provided to "suppress" air flow within the furnace. For example, "even if the outside air enters the furnace from the compact supply portion, the partitioning means suppresses air flow to the high temperature atmosphere space portion and the compact discharge portion" (col. 3, lines 4-7); "discharge portion partitioning means may be provided as a partition between the compact discharge portion and the high temperature atmosphere space portion ... air flow from the compact discharge portion to the high temperature atmosphere space portion is suppressed" (col. 3, lines 14-18); "partitioning means may be provided as partitions at least between a heating zone, a CO ratio control zone, and a reducing atmosphere zone in the high temperature atmosphere space portion. Thus, air flow in a side portion of the frame between the respective zones can be suppressed" (col. 4, lines 50-55). The air flow is suppressed by the flow rate-controlling partitions in both directions F_1 and F_2:

> Hence, air F_1, which has flowed forward in the direction of rotation of the hearth 34 after the entry of the air F into the furnace through the compact supply portion 44, is blocked by the central partition plate 53a, and its flow into the high temperature space portion S can be suppressed. Air F_2 flowing toward the compact discharge portion 45, on the other hand, is blocked by the central partition plate 53b. Thus, this air can be prevented from contacting direct-reduced iron to be discharged from the compact discharge portion 45, and thereby reoxidizing the direct-reduced iron. (Col. 8, lines 1-11).

Indeed, even the portion of the specification of Kamikawa et al which was relied upon in the Office Action describes the partitions suppress the flow of air. Col. 8, lines 26-27.

"When the prior art teaches away from combining certain known elements, discovery of successful means of combining them is more likely to be nonobvious." *KSR International Co. v. Teleflex Inc.*, 82 USPQ2d 1385, 1395. "A prima facie case of obviousness may also be rebutted by showing that the art, in any material respect, teaches away from the claimed invention." *In re Geisler*, 43 USPQ2d 1362, 1366 (Fed. Cir. 1997). "A reference may be said to teach away when a person of ordinary skill, upon reading the reference...would be led in a direction divergent from the path that was taken by the applicant." *In re Haruna*, 58 USPQ2d 1517 (Fed. Cir. 2001); MPEP 1504.03.

One skilled in the art would be "led [by Kamikawa et al] in a direction divergent from" allowing the flow of the furnace gas in the direction of the movement of the hearth, i.e., in the direction F_1 mentioned at col. 8, line 1 of Kamikawa et al, because Kamikawa et al teaches that the airflow F_1 can cause oxidation and its flow must be suppressed. Kamikawa et al "increase[s] the operation efficiency" by blocking or suppressing air flow using the partition plates. This teaches away from a modification whereby "the furnace gas in the cooling step is *allowed to flow* in the direction of the movement of the hearth using the flow rate-controlling partitions." Rather, in order to "increase the operation efficiency" according to the teaching of Kamikawa et al, the partition plates would be modified to increase the blocking or suppression of air flow – not to allow air flow. Kamikawa et al thus teaches

away from allowing the flow of the furnace gas in the direction of the movement of the hearth, and so this feature of Claims 1 and 16 would not have been obvious to one skilled in the art.

As for the feature of Claim 2 that the pressure of the furnace gas in the melting step is maintained higher than that of the furnace gas in other steps using the flow rate-controlling partitions, the Office Action does not explain why a disclosure of greater operational efficiency due to the disclosed suppressed or blocked air flow in Kamikawa et al would have rendered it obvious to maintain a higher pressure in one of the furnace zones. Instead, Kamikawa et al *teaches away* from maintaining a higher pressure in one of the furnace zones since such a pressure difference will promote the flow of gas past the partition plates, i.e., the desired suppression of the gas flow will be impaired.

It is therefore respectfully submitted that the rationale underlying the proposed modification of Kamikawa et al in the Office Action is a *non sequitur*, and the withdrawal of this rejection is respectfully requested.

Claims 5-6 further recite that the partitions have perforations, and that the flow of the furnace gas is controlled to allow the furnace gas to flow in the direction of the movement of the hearth by varying a size of the aperture of the one or more perforations. Similarly, Claims 7-8 further recite a step of controlling the flow of the furnace gas to allow the furnace gas to flow in the direction of the movement of the hearth by moving at least one of the partitions vertically. In each case, the Office Action referred back the rationale set forth in the prior Office Action that controlling apertures or gaps in a partition would have been obvious in view of the disclosure in the third embodiment of Kamikawa et al that the partitions are vertically movable such that

> even if the height of the green compacts on the hearth 34 varies with the amount of supply of the green compacts supplied onto the hearth 34, the gap between the lower end portion of the up-and-down partition plate 73 and the green compacts can be constantly maintained at an

> appropriate level, by adjusting the height position of the up-and-down partition plate 73. *Consequently, flow of air inside the furnace can be suppressed reliably*, and damage to the up-and-down partition plate 73 can be prevented. (Emphasis added).

Nonetheless, as is evident from the above description, the adjustment of the partition taught in Kamikawa et al is performed so that "flow of air inside the furnace can be suppressed reliably." This teaches away from adjusting the height or an aperture to allow the furnace gas to flow in the direction of the movement of the hearth, as is recited in the claims. For this reason as well, Claims 5-8 define over Kamikawa et al.

Applicants therefore believe that the present application is in a condition for allowance and respectfully solicit an early Notice of Allowability.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Robert T. Pous
Attorney of Record
Registration No. 29,099

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 08/07)